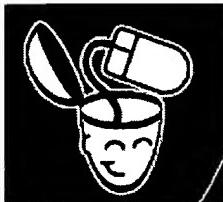


L Number	Hits	Search Text	DB	Time stamp
-	9940	((multi multiple dual plural) adj1 (port ported)) adj2 (cache memory RAM))	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/05/04 12:08
-	3516	((multi multiple dual plural) adj1 (port ported)) adj2 (cache memory RAM)).ti,ab.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/05/06 11:35
-	559	((((multi multiple dual plural) adj1 (port ported)) adj2 (cache memory RAM)).ti,ab.) and processor and RAM	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/05/05 14:50
-	480	(((((multi multiple dual plural) adj1 (port ported)) adj2 (cache memory RAM)).ti,ab.) and processor and RAM) and @ad < "20000612"	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/05/04 18:18
-	3	(((((multi multiple dual plural) adj1 (port ported)) adj2 (cache memory RAM)).ti,ab.) and processor and RAM) and @ad < "20000612" and altera.as.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/05/04 15:44
-	480	(((((multi multiple dual plural) adj1 (port ported)) adj2 (cache memory RAM)).ti,ab.) and processor and RAM) and @ad < "20000612"	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/05/05 14:11
-	480	(((((multi multiple dual plural) adj1 (port ported)) adj2 (cache memory RAM)).ti,ab.) and processor and RAM) and @ad < "20000612"	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/05/05 14:16
-	48	(((((multi multiple dual plural) adj1 (port ported)) adj2 (cache memory RAM)).ti,ab.) and processor and RAM) and @ad < "20000612") and (PLD FPGA EEPROM PROM)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/05/05 14:38
-	2	4769642.bn.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/05/05 14:38
-	3516	((multi multiple dual plural) adj1 (port ported)) adj2 (cache memory RAM)).ti,ab.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/05/05 14:52
-	3036	((((multi multiple dual plural) adj1 (port ported)) adj2 (cache memory RAM)).ti,ab.) not (((((multi multiple dual plural) adj1 (port ported)) adj2 (cache memory RAM)).ti,ab.) and processor and RAM) and @ad < "20000612")	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/05/05 14:52
-	570	(((((multi multiple dual plural) adj1 (port ported)) adj2 (cache memory RAM)).ti,ab.) not (((((multi multiple dual plural) adj1 (port ported)) adj2 (cache memory RAM)).ti,ab.) and processor and RAM) and @ad < "20000612")) and processor	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/05/05 14:52

	719	(((((multi multiple dual plural) adj1 (port ported)) adj2 (cache memory RAM)).ti,ab.) not (((((multi multiple dual plural) adj1 (port ported)) adj2 (cache memory RAM)).ti,ab.) and processor and RAM) and @ad < "20000612")) and (microprocessor micro-processor processor)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/05/05 14:53
	109	(((((multi multiple dual plural) adj1 (port ported)) adj2 (cache memory RAM)).ti,ab.) not (((((multi multiple dual plural) adj1 (port ported)) adj2 (cache memory RAM)).ti,ab.) and processor and RAM) and @ad < "20000612")) and (microprocessor micro-processor processor)) and ((arbitrate arbitration access) same RAM)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/05/05 14:55
	50	((((((multi multiple dual plural) adj1 (port ported)) adj2 (cache memory RAM)).ti,ab.) not (((((multi multiple dual plural) adj1 (port ported)) adj2 (cache memory RAM)).ti,ab.) and processor and RAM) and @ad < "20000612")) and (microprocessor micro-processor processor)) and ((arbitrate arbitration access) same RAM)) and @ad < "20000612"	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/05/05 18:10
	2	5802579.pn.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/05/05 16:14
	18	configurable adj1 SRAM	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/05/05 18:12
	12	(configurable adj1 SRAM) and @ad<20000612	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/05/05 18:12
	5	09/039891	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/05/06 11:35



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EPROM

Working with ROMs and PROMs can be a wasteful business. Even though th inexpensive per chip, the cost can add up over time. **Erasable programmabl memory (EPROM)** addresses this issue. EPROM chips can be rewritten mar Erasing an EPROM requires a special tool that emits a certain frequency of u light. EPROMs are configured using an EPROM programmer that provides vc specified levels depending on the type of EPROM used.

Once again we have a grid of columns and rows. In an EPROM, the cell at ea intersection has two transistors. The two transistors are separated from each oxide layer. One of the transistors is known as the **floating gate** and the othe **control gate**. The floating gate's only link to the row (**wordline**) is through the As long as this link is in place, the cell has a value of 1. To change the value 1 curious process called **Fowler-Nordheim tunneling**. Tunneling is used to al placement of electrons in the **floating gate**. An electrical charge, usually 10 to applied to the floating gate. The charge comes from the column (**bitline**), entre gate and drains to a ground.

This charge causes the floating-gate transistor to act like an **electron gun**. The electrons are pushed through and trapped on the other side of the thin oxide I a negative charge. These negatively charged electrons act as a barrier betwe gate and the floating gate. A device called a **cell sensor** monitors the level of passing through the floating gate. If the flow through the gate is greater than the charge, it has a value of 1. When the charge passing through drops below percent threshold, the value changes to 0. A blank EPROM has all of the gate giving each cell a value of 1.

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"To quote my students,

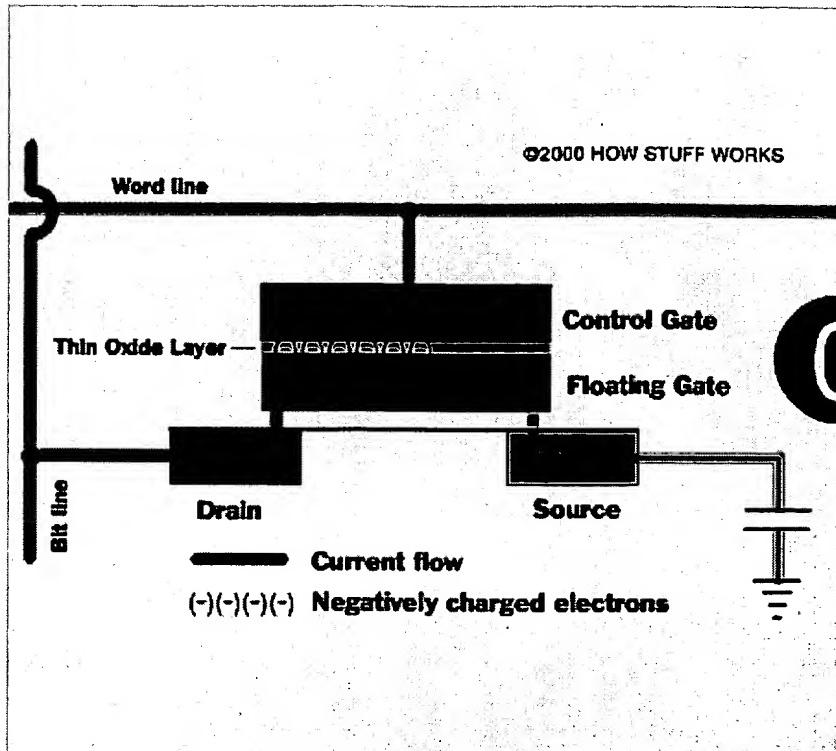


Figure 3

To rewrite an EPROM, you must erase it first. To erase it, you must supply a strong enough to break through the negative electrons blocking the floating gate. In a standard EPROM, this is best accomplished with UV light at a frequency of 254 nm. This particular frequency will not penetrate most plastics or glasses, so each EPROM has a quartz window on top of it. The EPROM must be very close to the eraser's window, within an inch or two, to work properly.

An EPROM eraser is not selective, it will erase the entire EPROM. The EPROM must be removed from the device it is in and placed under the UV light of the EPROM eraser for several minutes. An EPROM that is left under too long can become over-erased. In this case, the EPROM's floating gates are charged to the point that they are unable to hold electrons at all.

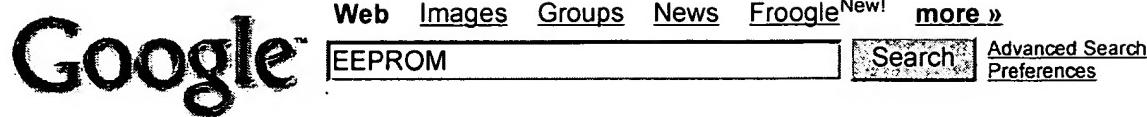
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